

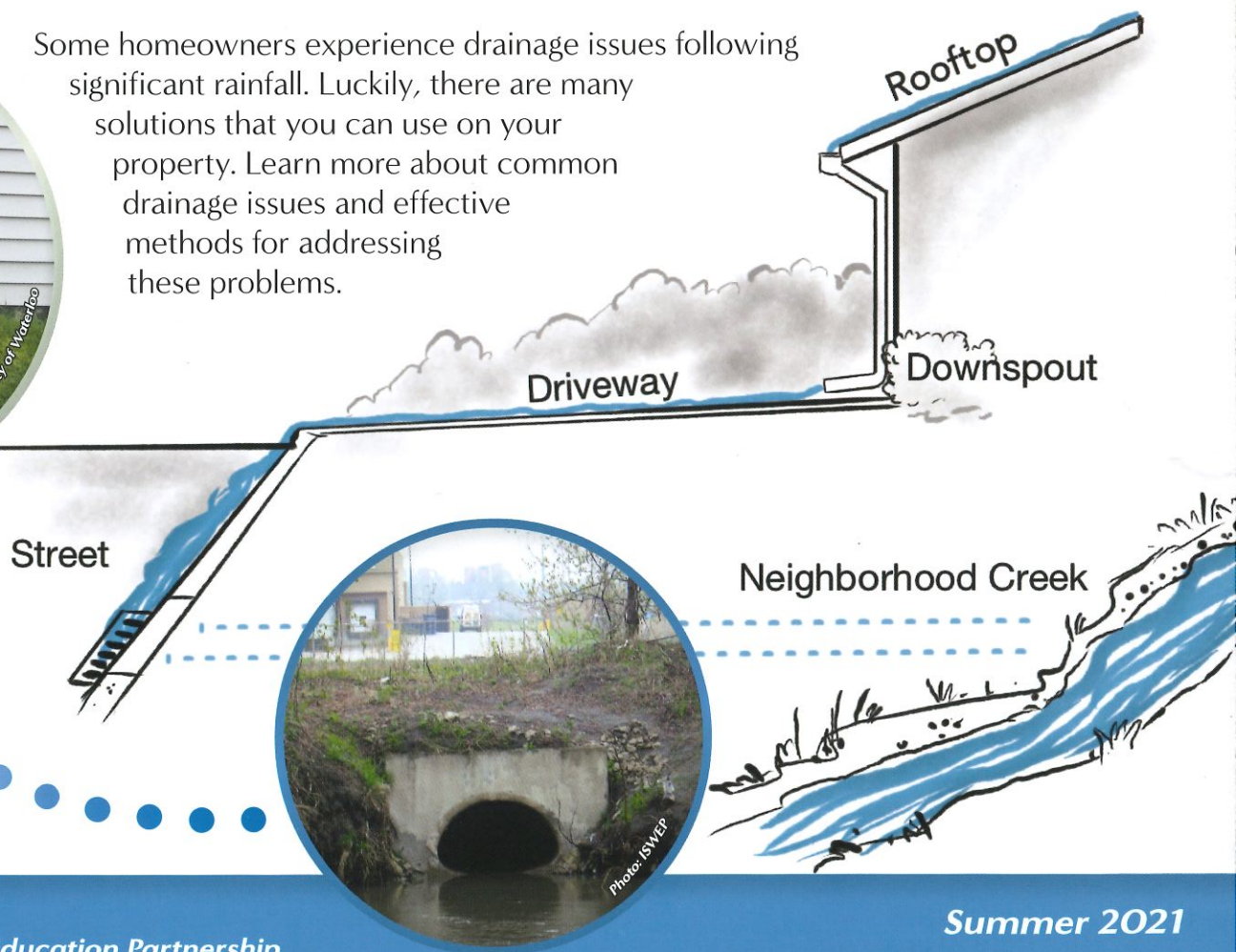
Urban Stormwater Drainage

What happens to rain that falls on my yard?

If you have healthy soil under your lawn, a lot of the rain will soak into the ground and be absorbed by trees and plants. However, many urban lawns have heavily compacted soils. These soils act like concrete and shed rainwater similar to other impervious surfaces, such as driveways, sidewalks, streets, and rooftops.

Rainwater that is not absorbed by your lawn typically enters a nearby storm sewer intake in the street. From there, an underground storm sewer pipe system carries it to a neighborhood pond, or nearby stream, river, or lake. During periods of intense rainstorms, excess stormwater runoff is generated that can cause localized flooding. Homes and yards located too close to waterways are often adversely impacted in this all-too-common scenario.

Some homeowners experience drainage issues following significant rainfall. Luckily, there are many solutions that you can use on your property. Learn more about common drainage issues and effective methods for addressing these problems.



Common Drainage Issues

Drainage issues may look different from home to home, but most problems stem from compacted soils and concentrated drainage that causes erosion, flooding, and sump pump concerns.

Heavily Compacted Soils & Erosion

There may be areas in your yard where it is hard to grow grass and other plants. There may also be areas that remain wet after rain. This may be caused by poor soil health. Due to mass grading practices during and after construction, yards in newer developments often have soils that are heavily compacted with little topsoil to sustain a lawn. Soil particles are packed more closely together in compacted soils, making it more difficult for rain to soak into the soil. It also makes it more difficult for grass, plants, and tree roots to spread out and grow to find nutrients and water during dry spells. Often, very little topsoil is returned to the lawn and only clay soils remain. Clay soils contain small soil particles that are difficult to drain, especially when compacted.

Additionally, areas that erode after a rainfall typically receive too much concentrated rainfall drainage at one time. Vegetation on the soil surface is unable to withstand the force of the water. Eroded sediment can also accumulate in some of these areas that can smother existing vegetation and cause a surface crust that prevents rain from soaking into the soil. This can be caused by excessive drainage from upslope areas on the property or neighboring property.

Flash Flooding

Homes located near rivers and streams in the floodway or floodplain are highly susceptible to flooding. This is especially true during large rainfall events and extended periods of rainfall. In some cases, homes are located too close to stormwater management features such as wet or dry basins. During large rainfall events, the height of the water in these practices may enter a home through basement windows.

Sump Pump Concerns

Most homes have subsurface foundation drains that are connected to sump pumps that pump water to the surface of a yard or are connected to a storm sewer. They are used to lower groundwater levels to prevent water from backing up into the basement. If groundwater levels are naturally close to the surface in your area, you may have continual sump pump discharges.



Do you have further questions? Contact your local community to learn more about options to address drainage issues.

Simple Drainage Solutions

Soil Quality Restoration (SQR)

Drainage on existing lawn soils can be improved through **SQR** that includes deep-tine aeration, topdressing with 3/4 of an inch of compost and seeding over the top. Deep-tine aeration (a minimum of 4 inches) helps to reduce compaction. Compost adds organic matter and nutrients to the soil. Over time, the lawn should require less fertilizer and water to maintain a healthy soil profile.

Or, improve soil health by converting part of the grass in your yard to **native prairie plants**. Native plants have deep roots that help soak up rainfall and improve soil health over time. They also provide habitat for pollinators such as butterflies.

SQR

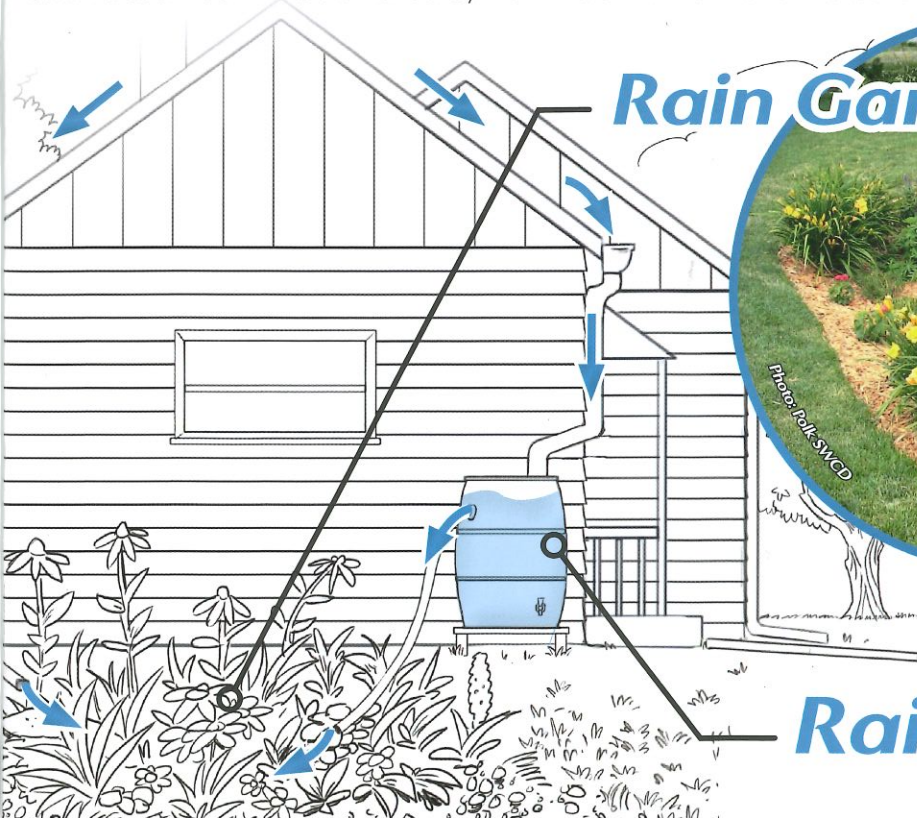


Redirect Downspouts

Redirecting downspouts from impervious surfaces such as sidewalks and driveways to vegetated areas is another simple solution for drainage issues. Try to disperse the concentrated flow by simply placing a flat rock or paver block to prevent soil erosion. **Subsurface drain tile** can be connected to the downspout and directed to a downslope area in the yard.

Another option would be to redirect a downspout to a **rain garden**. A rain garden is a shallow landscaped area that is planted to native plants or horticultural cultivars. Rainfall runoff is temporarily ponded, then drains into the subsurface soils. The soils must be able to drain properly to prevent extended ponding of water that would kill off vegetation. Ensure the garden is placed at least 10 feet downslope from a home foundation to prevent the infiltrated water from impacting the foundation.

Downspouts can also be redirected to a **rain barrel**. Collected rainwater can be used to water plants in gardens or lawn areas. You will be amazed by how much rainfall runoff is collected from a rooftop area during rainfall events!



Rain Garden



Rain Barrel



What are some solutions for complex drainage issues?

Some yards may be sloped and graded to concentrate rainfall drainage to areas that do not rapidly drain. In some cases, the drainage may even be directed toward the home, basement, neighboring homes, or other structures.

Even with healthy soils, some areas of your property may receive too much concentrated water drainage. Downspouts that collect water from a large portion of a roof may overwhelm areas where water is directed by the gutter system.

A number of issues can cause a wet basement after a heavy rainstorm. These might include a lack of foundation drains or shallow depth to groundwater (the sump pump cannot keep up with the amount of rain soaking into the ground).

The following practices are typically installed by trained landscaping professionals since there may be significant excavation required. Landscapers should be familiar with the issues listed above and offer reasonable solutions.



French Drains

A French drain is a gravel-lined trench either buried or exposed at the surface of the soil. They are used to direct water away from an area that does not drain well. The trench contains a buried subsurface tile drain. A beehive or other grate may be placed at the soil surface. It is used to collect ponded water and is connected to the subsurface drain tile. Some french drains can also infiltrate rainwater without a subsurface tile.

Foundation Drains

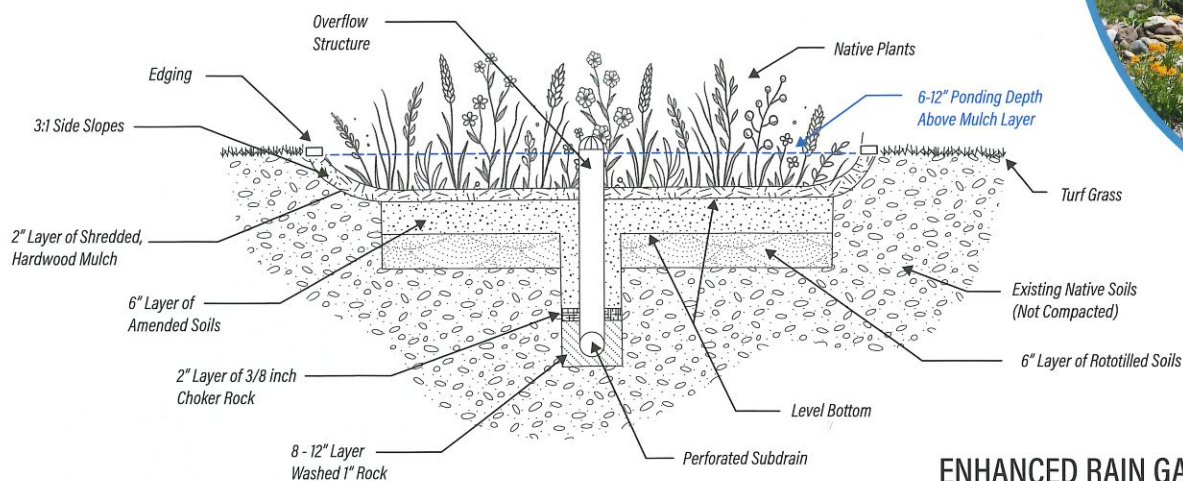
Foundation drains are similar to French drains, except that they are buried around the foundation of a home. Options for discharge include a direct connection to storm sewer pipes near the street, if available. In other cases, the outlet may be daylighted to a vegetated surface downslope from the home.



Flip For More
Solutions!

Enhanced Rain Gardens

Drainage, in addition to downspout discharge, can be redirected from a poorly drained area to an enhanced rain garden located downslope from a home. It is a shallow depressional feature that contains a subsurface perforated drainage pipe buried in gravel with overlying soil amended with sand, topsoil, and compost. The surface can be planted with prairie plants, grasses and/or horticultural cultivar flowers. Plant selection is based on sun and soil conditions.



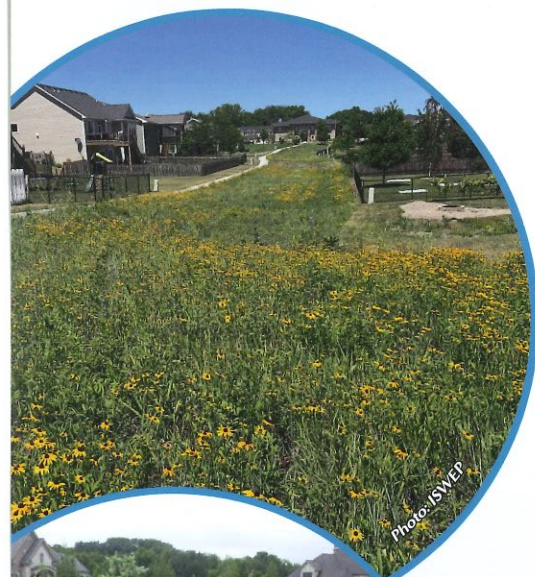
ENHANCED RAIN GARDEN
SOURCE: ISWEP 2021



Bioswales

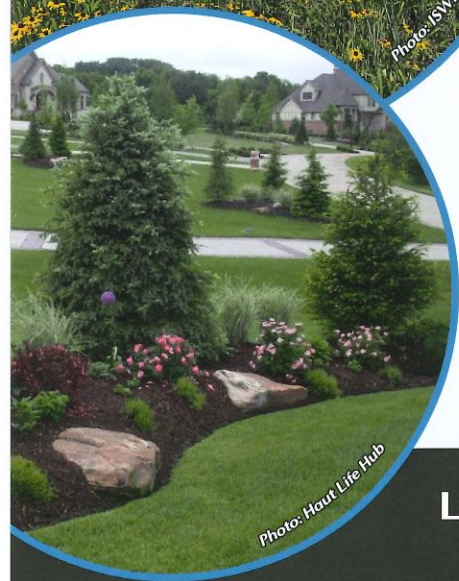
A bioswale is a long and narrow depression that can convey rainfall runoff away from an area where drainage issues occur. Bioswales are often placed in drainage easements in backyards to drain and convey stormwater runoff downslope, typically to a flood management practice such as a wet or dry pond.

In comparison to a normal swale or drainage easement, a bioswale is built with amended soils to improve rainwater infiltration. The bioswale needs to be stabilized with turf grass, prairie plants, or woodland plants, depending on sunlight conditions.

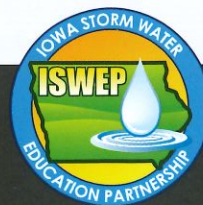


Diversions, Berms, and Walls

A diversion or berm is a vegetated, earthen, elongated mound used to divert drainage away from an area to a downslope stabilized area. They are vegetated landscape features. Walls can sometimes be used to divert stormwater runoff. They may contain a combination of soils overlain by paver blocks. Subsurface drains are typically placed at the base of the wall for additional drainage.

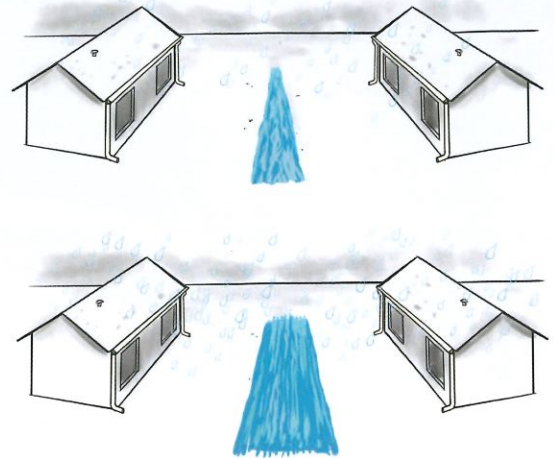


Learn more about stormwater management at:
www.IowaStormwater.org



What is a drainage vs. conservation easement?

In newer neighborhoods, there may be **drainage easements**. An easement is a portion of land set aside for a specific purpose, by property deed. Easements are most often used for utilities and stormwater conveyance. Stormwater drainage easements are used to safely convey water across properties to a storm drain or stormwater pond. The easement allows the local jurisdiction access for repairs and maintenance. It is important that these easements be kept free of obstructions to maintain proper conveyance of stormwater runoff. Placement of wood piles, debris, play structures, fences, and other potential obstructions is prohibited.



*Drainage easement in residential neighborhood.
Graphic: ISWEP*



In comparison, a **conservation easement** is a voluntary agreement between a landowner and land trust or government entity in which the landowner retains some of the private property rights. It is used to permanently protect natural resources and the conservation resources of a property. Conservation easements can be used to protect vegetative habitats and stream buffers, and areas of historical significance. They can also be used for creating outdoor recreation opportunities.

Home Owners Associations (HOAs)

Some HOAs will oversee some or all of the management and maintenance of property that might be used for stormwater practices or to protect natural resources in a development. Stormwater features might include bioswales or grassed swales used to convey stormwater runoff. HOAs might oversee flood control practices as well, such as wet ponds (retention basins), dry ponds (detention basins), and wetlands. In some communities the stormwater practices may be managed in part or whole by the local jurisdiction. Some HOA land areas may also be reconstructed prairie that are part of a larger stormwater treatment train. A treatment train is a series of interconnected stormwater practices that may function to remove pollutants and minimize flooding. Woodland areas can also be protected and managed by the HOA. Sometimes these areas are made more accessible to the neighborhood through interconnected trails.



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